

### **ABSTRACT OF THE DISCLOSURE**

Ionic gel polymer electrolytes for rechargeable polymer batteries. In preferred forms, a gel polymer precursor electrolyte is formed by  
5 dissolving a gelling agent into organic liquid electrolytes, and then gelling the precursor in situ at elevated temperature after pouring it into a battery case that contains a cathode, an anode and a separator. The gel polymer electrolytes exhibit excellent ionic conductivity of up to about  $10^{-2}$  S/cm and voltage stability for lithium rechargeable batteries. Most preferably,  
10 the gel polymer electrolyte is the reaction product of (A) nitrogen-group containing polymers, copolymers, oligomers or monomers that are capable of reacting with halogen compounds or epoxy compounds, such as, polymers, copolymers, oligomers or monomers containing primary, secondary or tertiary amines, and (B) halide or epoxy-group containing  
15 polymers, copolymers, oligomers or monomers that are capable of reacting with nitrogen-containing compounds, such as polymers, copolymers, oligomers or monomers containing alkylene halides or halomethyl group substituted aromatic units or at least one epoxy unit. Especially preferred (A) materials include pyridine compounds, and most  
20 preferably vinylpyridines, such as poly(2-vinylpyridine) and copolymers thereof. Especially preferred compounds useable as material (B) include bis(bromomethyl)benzene,  $\alpha,\alpha'$ -dibromoxylene, diiodoalkanes, 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexanecarboxylate, butadiene diepoxide, and butanediol diglycidyl ether.